

Chapter 10

Characterizing the Risks from Proposed Solutions to Protect and Manage Wetlands

10.1 Introduction

The scientific information available indicates that as human populations grow, we increasingly impact the environmental processes that maintain the functions of our natural resources (Dale et al. 2000). We have not yet found the ways by which we can eliminate impacts in the face of our growing population. The goal for managing our natural resources, including wetlands, should be to minimize the risk to resources from our activities (Cairns 1997).

A characterization of risks considers both the adverse impacts and improvements that result from actions that are proposed to manage wetlands and changes in land use. Such a characterization provides a way to develop, organize, and present scientific information so that it is relevant in making decisions about future land uses. It also provides a basis for comparing different options for managing wetlands, and it enables decision-makers and the public to make more informed decisions about wetland resources. This approach can be used to describe the likelihood of future adverse impacts or the likelihood that past decisions have already impacted the resource.

Local jurisdictions must consider whether the plans, policies, and regulations they are developing will minimize the risk to the functions and values of wetlands. If the risk to the wetland resource is still high with the proposed plans, policies, and regulations in place, the jurisdiction will want to find additional measures that can be taken to further lower the risk.

The descriptions of impacts used for a risk characterization may range from qualitative judgments to quantitative probabilities. The guidance for characterizing risks described in this chapter can be applied to both approaches (qualitative and quantitative). The task is to characterize each policy, zoning map, regulation, exemption, etc. based on its risk to the wetland resource.

For example, a regulation that sets a 300-foot buffer around every wetland significantly reduces the risk to wetlands from human activities in the immediate vicinity. That regulation can be characterized as having “low risk.” On the other hand, the review of the literature indicates that a 30-foot buffer alone is not large enough to protect most functions of a wetland. A jurisdiction that decides the only regulation they will provide for a wetland is a 30-foot buffer would have to characterize their action as having “high risk.”

There are no simple, unambiguous methods to characterize the risks of different actions that can be taken by local jurisdictions to protect wetlands. The methods are being developed and are still quite subjective. Ecology and Fish and Wildlife recommend, however, that local jurisdictions try to characterize the risk of their actions. A subjective characterization is better than none at all if the choices and decisions made are documented. The following section outlines one type of process by which the risks can be characterized and documented.

A characterization of risks of proposed solutions to protect and manage wetlands is not a requirement of the Growth Management Act. However, the procedural guidelines adopted by CTED in 2001 recommend the identification of risks to critical area functions and values resulting from the adoption of development regulations. Following are relevant excerpts from WAC 365-195-915:

Criteria for including the best available science in developing policies and development regulations.

(1) To demonstrate that the best available science has been included in the development of critical areas policies and regulations, counties and cities should address each of the following on the record:

(c) Any nonscientific information -- including legal, social, cultural, economic, and political information -- used as a basis for critical area policies and regulations that depart from recommendations derived from the best available science. A county or city departing from science-based recommendations should:

(i) Identify the information in the record that supports its decision to depart from science-based recommendations;

(ii) Explain its rationale for departing from science-based recommendations; and

(iii) Identify potential risks to the functions and values of the critical area or areas at issue and any additional measures chosen to limit such risks. State Environmental Policy Act (SEPA) review often provides an opportunity to establish and publish the record of this assessment.

10.2 A Process for Characterizing Risk

Ideally, local jurisdictions will be taking steps to protect and manage wetlands at the different geographic scales discussed in previous chapters. Whether planning at the scale of the management area or the site itself, the risks can be characterized by answering a series of questions about the actions being proposed:

- What disturbances will be caused by a proposed action (e.g., change in land use through zoning, regulations that affect how land is used, etc.)?

- What risk do these disturbances pose to the functions and values of wetlands?
- What measures are proposed to minimize the risk or replace the resource at risk?
- Do these measures reduce the risk to acceptable levels?

10.2.1 Identifying the Environmental Disturbances Caused by Proposed Solutions

Volume 1, Chapter 3, summarized the different types of environmental disturbances that can occur as humans modify natural ecosystems to meet our needs. The plans, regulations, and other approaches taken by local jurisdictions to direct and control the use of land can therefore also be characterized in terms of the disturbances they may allow, or rectify. The first step in characterizing the risk, therefore, is to identify how a specific type of land use activity may cause an environmental disturbance.

The characterization of risks should start with a thorough list of the different solutions being proposed to protect and manage wetlands (zoning categories, regulations, exemptions, ordinances, and so on). Each of these has the potential to cause an environmental disturbance by allowing certain land uses to occur or by changing the current land use to some other one.

The types of environmental disturbances identified in Volume 1 include:

- Changing the physical structure within a wetland (e.g., filling, removing vegetation, tilling soils, compacting soils);
- Changing the amount of water (increasing or decreasing the amount);
- Changing the fluctuation of water levels (frequency, amplitude, direction of flow);
- Changing the amount of sediment (increasing or decreasing the amount);
- Increasing the amount of nutrients;
- Increasing the amount of toxic contaminants;
- Changing the water temperature;
- Changing the acidity (acidification);
- Increasing the concentration of salt (salinization);
- Decreasing the connection between habitats (fragmentation); and
- Other disturbances (noise, etc.).

For example, at the scale of the management area, areas zoned as urban have the potential to change the patterns of water flow, increase the input of nutrients and toxic compounds,

and cause fragmentation of the landscape. Areas zoned as high-density residential have the potential to change patterns of water flow, introduce toxics from lawn care, and disturb wildlife by introducing predation by pets.

An example of disturbances caused by management actions at the site scale is that of allowing single-family residences, as an exemption, in the buffers of wetlands. Such an action would allow disturbances from nutrients and toxics (lawn care), pets, and possibly a change in water regime to occur.

Table 10-1 provides an example of how the environmental disturbances and risks associated with various management actions could be summarized.

Table 10-1. An example of a table summarizing risks associated with common land use actions.

Action	Disturbance caused by allowing action	Risk of disturbance to wetland functions and values
Urban zoning in a recharge area	Change in water regime, increased surface runoff, and less infiltration	High for wetlands fed by groundwater and for those that will receive the direct runoff from paved surfaces
Permit fill of wetlands	Change in structure of wetland and loss of wetland area	High for functions within wetland
300 ft buffers for wetlands with a high habitat score	Minimal	Low
200-300 ft buffers for high habitat score	Will allow some disturbance of wildlife and limit upland zones suitable for amphibians	Moderate
< 200 ft buffers for high habitat score	Significant disturbance of wildlife	High

10.2.2 Identifying the Risk of Disturbances to the Functions and Values of Wetlands

Not all human-caused disturbances will result in significant impacts to the functions and values of wetlands in a jurisdiction. Once all the possible disturbances have been identified (as discussed in the previous section), the next step in the characterization of risk is to identify which of the proposed land use actions have the greatest risk of impacting wetlands. This task is best done using maps, especially at the scale of the management area. The process described in Chapter 5 for performing a landscape analysis can be used to identify what parts of the landscape within the management area are sensitive to the different types of disturbance that may be generated by proposed land use actions.

For example, if wetlands are located in an area zoned as urban or residential, then the risk to these wetlands is high as a result of the disturbances these land uses generate. Creating

impervious surface in areas where water infiltrates rapidly into groundwater creates a risk to wetlands that rely on that groundwater.

Regulations that focus on the wetland sites themselves can also be analyzed in terms of the risks they pose to wetlands. For example, the exemption of single-family residences in the buffer of a wetland (mentioned previously) would pose a much higher risk to wetlands that have a high habitat value than those that function poorly as habitat. Actions to reduce the risk to wetlands should also be considered in this characterization.

Areas that are proposed for restoration or preservation as part of a jurisdiction's planning process should be considered in terms of how these actions might reduce the risks to wetlands. For example, the restoration of a diked field to a floodplain wetland would improve the flood storage function of wetlands and reduce the overall risk to the jurisdiction from losses of this wetland function.

10.2.3 Proposing Measures to Minimize the Risk or Replace the Resource at Risk

If the characterization of risk indicates that some of the regulations, policies, or plans pose a risk to the functions and values of wetlands in a jurisdiction, it is important to identify what actions can be taken to minimize this risk. For example, if a comprehensive plan calls for urban development in an area where groundwater is recharged, the risk to the aquatic resources can be reduced by requiring that all runoff be infiltrated on-site, or that paved areas use some of the more innovative approaches such as permeable surfaces.

A summary table such as that shown in Table 10-2 can be used to document the risks identified and the actions taken to minimize risks.

Table 10-2. An example of a table summarizing the risks of land use actions and measures to minimize the risks.

Action	Disturbance caused by action	Risk of disturbance to wetland functions and values	Measures to minimize risk	Does this reduce risk to acceptable level?
Urban zoning in a recharge area	Change in water regime, increased surface runoff, and less infiltration	High for wetlands fed by groundwater and for those that will receive the direct runoff from paved surfaces	Change development standards in recharge area to require all surface water to be infiltrated	yes
Permit fill of wetlands	Change in structure of wetland and loss of wetland area	High for functions within wetland	1. Require compensation at ratios that will ensure no net loss 2. Ensure compliance 3. Do not permit fill in wetlands that cannot be replaced (e.g., bogs)	maybe

The King County example of a characterization of risk

As part of revisions to its critical areas ordinance, King County has prepared an *Assessment of Proposed Ordinances* that describes the risks to resources from the county's proposed regulatory and non-regulatory actions. Section 2.9 from Chapter 2 of the King County report describes the risks to the wetland resource from actions such as specified buffers, allowed alterations, classification (rating), and mitigation requirements. One section of the King County report is reproduced in Appendix 10-A of this volume. The report is also available on the web at <http://www.metrokc.gov/ddes/cao/>.